

> -----Original Message-----

> From: Simon
> Sent:
> To:
> Cc: Shelley, Gerald; Dovey, Steve;
> Subject: RE: Shuttle evaluation
>

> ...

> In case of future problems where is the fan fuse ?

> It sounds like you will be ready to ship the pump by the end of this
> week....If you can have the pump shipped by Friday we can get it back into
early next week. The sooner the better.

> Please ship the pump to my attention at the Santa Clara office,

>

>

>

>

> Let me know when you ship it.

>

> Thanks

>

> Simon

>

>

> -----Original Message-----

> From: John
> Sent:
> To: Simon
> Cc: Shelley, Gerald; Dovey, Steve;
> Subject: Shuttle evaluation

>

> Simon,

>

> The pump has been repaired and is currently running as expected on our
> test rig. We plan to keep an eye on it for a couple of days and then send
> it back to you. Please let me know where I should send it.

>

> I apologise for the failure as it appears to be all our fault. We forgot
> to put the thermal pad behind the FET's on the PCB, consequently the metal
> case didn't dissipate the heat generated by these devices. The problem was
> compounded by the blown fan fuse. This was also probably down to us, as
> the fan wires were trapped by the assembly of the cover plate.

>

>

> Regards,

>

> John

>

>

> -----Original Message-----

> From: Simon

> Sent:

> To: Mr, John

> Cc: Shelley, Gerald; -

> Dovey, Steve;

> Subject: RE: Shuttle evaluation

>

> Hi John,

>

> Our e-mail was down all last week and I am told we have potentially
> lost e-mails sent between the 15th and 19th - If you have been waiting for
> an answer I apologise.

>

> In the absence of e-mail I phoned last week and spoke with Stave
> Dovey. On his suggestion we have returned the unit to Shoreham for you to
> look at.

> We also speculated that the mis-wiring at may have overloaded
> certain circuits - they had only connected 24 Volts to one of the three
> pins where the manual requests it.

>

> At we have told the engineers that we suspect that the wiring
> caused a problem but are still investigating the failure.

> We have reassured them that we still believe the pump is suitable
> and are still planning to supply a second unit.

>

> are still interested, naturally they want to know on what date
> we can supply another unit. Farhad is progressing this with
> in the US. We are thinking that the original pump they ordered for
> evaluation will be the best way to handle this. We will supervise the
> wiring but will be much happier if you are able to identify the cause of
> the problem through inspection of the failed pump.

>

> On the application front, I have told you everything I know. I guess
> our direct approach to the manufacturer is the most likely avenue
> to learn more. Failing that we will plan to run a vacuum gauge in series
> with the next pump to determine the operating pressure. If there is
> anything else you would like to know drop Farhad or me a line.

>

> Regards

> Simon

>

>

>

>

>

>

> -----Original Message-----

> From: John

> Sent:

> To: Simon

> Cc: ; Shelley, Gerald;

> Subject: FW: Shuttle evaluation

>

> Simon,

>

> I can't add a great deal to what's already been said. If you
> return the pump we can conduct a thorough failure diagnosis. I do not have
> enough pumps available to simulate the application at the moment, but this
> will change in the next couple of weeks.

>

> More specific application details would be useful.

>

> Regards,

>

> John

> -----Original Message-----

> From: Shelley, Gerald

> Sent:

> To:

> Subject: Shuttle evaluation

> John

> I can't tell the fault on the fan - check the fuse, if not
> its dead!

> If you want to simulate the problem, you need to try running
> the pumps at the pressure / flow seen in the field, there is a peak in
> drive (not motor) power dissipation between roughing and when the knock
> sensor is in control.

> Regards

> Gerald

> -----Original Message-----

> From:

> Sent:

> To: Shelley, Gerald

> Subject: Shuttle evaluation

> Gerald,

> From Simon's report can you ascertain why the cooling fan
> does not work ?

> I have loaded several of these pumps by roughing them
> continuously, the pumps get hot and eventually trip thermally, but the
> drive never cooks. We have not witnessed the drive temperature high fault
> code before. This pump ran here for over 200 hours before we sent it.

> I would not have been surprised if the 285 to 660 Torr
> application had caused the coil fuse to trip, but the drive temperature
> high fault code baffles me.

> Regards,

> John

> -----Original Message-----

> From:

> Sent:

> To:

> Cc: Dovey, Steve;

> Subject: Shuttle evaluation

> John

> Yes indeed it appears the drive is cooking.

> The fact that the Normal light is off indicates the
> machine is not at full stroke and therefore is probably at maximum
> current.

> This area of operation just below normal is maximum
> power in the drive, and may require the current limit to be lowered if
> long term operation is required. The side affect would be that pump

> downtime will increase (but how much?), and the operating pressure seen by
> the system will rise (the original design was aimed at basing
> turbos).

>
> The lack of cooling fan does not help, the case of
> the plinth should be getting warm on the top surface near the connections
> to the pump (after several minutes / when it trips). If not its possible
> the thermal pad between the case and the board is missing.

>
> How long is it before it trips?

>
> Assuming there is no build problems, is there any
> way we can reduce the load on the pump or rest it between cycles?

>
> Regards

>
> Gerald

> -----Original Message-----

> From:

> Sent:

> To: Snellley, Gerald

> Subject: Shuttle evaluation

>
> Gerald,

> Drive temperature high ? We haven't seen this
> before. Any thoughts ?

>
> Regards,

>
> John

> -----Original Message-----

> From:

> Sent:

> To: John: Dovey, Steve

> Cc:

> Subject: Shuttle evaluation

>
> John, Steve,

>
> We have run into a fault code on the shuttle pump at
> so need your help interpreting it. Farhad is the local engineer and
> has been looking after this but as he was on holiday I went in to take a
> look. I have tried to give you all the information I have, from experience
> I think you can never get too much !

>
> When I arrived the pump was connected up to the
> tool's vacuum manifold via 3 meters of 3/8" tubing.

> The pump was switched off and cold.

> I asked them to turn it on and it started up without
> problem. The Amber LED was lit but the green LED was not.

> After about 3 minutes the pump tripped off and the
> amber LED gave the following code_....

> It was not hot to touch.

>
> I disconnected the pump from the manifold, plugged
> the inlet and asked them to re-start it. The pump started again and this
> time both LEDs lit up and the pump ran happily.

> Suspecting a leak I inspected the tubing and found
> one big enough to make the wind whistle.

> We fixed that and re-connected the pump.

>
> Sure enough, both LEDs came on almost immediately
> and the pump ran fine.

> The technician then showed me the problem he had
> run into earlier.

> . There is a small port on the end of the moving robot
> arm. Once a wafer is seated on the arm a valve in the line below is opened
> and the vacuum applied.

> When the wafer was loaded I noticed that the green
> LED went off and stayed off. After a short period the pump tripped again
> giving the same error code as before.

> It looked as if the seal between the wafer and the
> port was pretty poor so my guess is that this introduces a leak.

> I could simulate the fault in the lab by running
> with an open inlet.

> As an aside

> The pressure in the vacuum line beneath the wafer is
> sensed using an SMC pressure switch and this is used to determine if the
> wafer is secure.

> At atmosphere this reads 0 and with the QDP40 it
> reads 720 so I assume it is reading Torr (gauge). With the line open to
> atmosphere at the robot arm but the valve open to the QDP40 the sensor
> registers 590. This seems high but I don't know how it works. The
> manual shed little light on it.

> (The robot is model Aqua-Tran 7 - all the
> instruction manual says is that it requires 24" of vacuum).

> Using the Shuttle pump instead of the QDP40 gave a
> reading of 285 (instead of 590) with the pipe open to atmosphere and 660
> (instead of 720) with a wafer loaded. It seems to give enough suck and the
> wafer is held firmly. I was happy with the 660 figure but the pump
> does not seem to be judging by the alarm signal.

> I noticed that the fan was not working and checked
> the wiring to find not all the pins were connected per the instructions.

> I told them that I thought the pump had been
> mis-wired and they agreed to give me the cable so that we could re-wire it
> in Santa Clara.

> I took the pump and told them that I wanted to check
> what the fault code meant and would try to get back with them in the
> middle of next week.

> They like the pump, but are not sure if it is big
> enough. We agreed to hold off making any final judgements until we know
> what the alarm code means.

> Other possibly significant information.

> 1) The cooling fan was not operating but I don't
> think it was mis-wired - it would not work when I tried it in Santa Clara.

> 2) I checked the wiring and they had connected
> only a few of the pins as follows - Red to 1, 2 & 3 linked, Black to 8
> and Green to 13.

> 3) The technician let it slip that they had run the
> pump for a while with the plug in the exhaust - they did not know which
> port was the inlet and had mis-interpreted the arrow next to the inlet
> thinking it indicated exhaust. Apparently the pump got pretty hot (they
> could not touch it) but did not appear to trip.

> The pump is in Santa Clara on my desk.

> I am out of the office Monday and Tuesday.

> Farhad will handle the Lam side of things so please
> deal with him and copy me.

> Regards

> Simon

> BOC EDWARDS

> *:

> -----Original Message-----

> From:

> Sent

> To:

> Cc: Steele, David-EHVI;

> Subject: RE: / shuttle opportunity

>

> I think there is space for both shuttle and small XDS in our future plans:

> * Shuttle meets the low power, small, low cost, low maintenance

> (hopefully) needs of gc/ms and maybe a proportion of RGA - mainly

> defensive and some incremental business in the RGA and semicon/robotics

> sectors.

> * Small XDS opens the door for gel drying, freeze drying, rotary evap,

> centrifuges - mainly growth business

>

> However, our TTM record is horrible and I'm concerned that we would

> struggle to do both effectively, so here's an idea ...

> 1. Go full steam ahead with the small XDS program - it's going to grow the

> business.

> 2. Re-consider diaphragm pumps for the very small dry market - have we

> closed the door on buying KNF, Vacuubrand, Thomas, Gast or whoever?

>

> Looking forward to discussing this with you,

> Regards,

> Michael

>

>

> -----Original Message-----

> From:

> Sent

> To:

> Cc: Steele, David-EHVI;

> Subject: / shuttle opportunity

>

> Mike,

> Yes, Ron told me about this and we have exchanged a few e-mails and talked

> on the phone about it. The situation with the small dry pump is that we

> had a review of the shuttle with SEO about 5 weeks ago as you know when

> the cost was £230 - £250 and agreed that we needed to have a radical

> review of the design to make it viable and we should also consider the

> small scroll option. A second review was supposed to be held 4 weeks later

> to make the decision but this has now been postponed until mid September

> because SEO is very busy.

>

> Meanwhile the shuttle team has been busy working on fairly radical new

> design thoughts (based on an extruded pump body which also houses the

> electronics) and believe that they have the cost down to £181. Experience

> would suggest that we ought to assume £200 by the time they have come up

> against all the problems that they will surely come up against but we

> might get this lower in the future if we get the volume so from a price

> point of view I think this looks good. Other advantages of the new design

> are that it should be easier to put together which makes it a better fit

> with BOCE manufacturing capabilities (I am not insulting our manufacturing

> capabilities when I say this but we're not set up to put things together

> with white gloves and tweezers) and should also be easier to service. It

> is a radical design change however which means that it will take a while
> to get into production. My other worry about it is that it is still a
> valve based pump like a diaphragm pump and is therefore always going to
> struggle to get good ultimates and keep them in the face of moisture and
> particles which is a definite negative relative to a scroll.
>
> The plan ahead therefore is that we agree a plan in mid September which
> needs to cover:
> * do we do the new style shuttle and forget about small scrolls at
> least for the moment
> * if we do the new style shuttle do we make a load of current style
> shuttles for example for to get the market warmed up and to get field
> experience of the shuttle mechanism
> * do we go for a small scroll as our intended small dry solution for
> the next few years and keep the shuttle running on a back burner in case
> it's low power, small size feature make it desirable to have as well as a
> small scroll in the future
> * do we try to do small scroll and shuttle in parallel
>
> Peter Coxon is supposed to be writing a report summarising the merits,
> etc. of the different choices. Assuming this is ready before the meeting I
> will send you a copy for your comments. I would say however that I cannot
> see how we could sensibly do bullet 2 in timescales. The reason is
> that the continued testing of the current shuttles is showing a number of
> problems which can be overcome in the new design but which would need
> quite a bit of work to get sorted in the current design. We would
> therefore need to take resource away from the future design team to patch
> up the current design plus do all the work to get it into some form of
> production. In addition, whilst it might be possible to get into non-std
> production sufficient to produce a load of evaluation units it is a very
> different thing to produce products that we could sell to an OEM which
> implies to be a proper product launch and a commitment to support in the
> future.
>
> I left it with Ron to find out a bit more about what requirements
> were - would they be happy with a fairly drastic change in design in pump
> after a year for example. I have also asked the shuttle team to give me an
> idea of the work required to get the current design into non-std or std
> production. Please let me have your thoughts and I'm sure we will talk
> about it in September in the US as well.
>
>
> Regards,
> James
>
> -----Original Message-----
> From:
> Sent:
> To:
> Cc: Steele, David-EHVI
> Subject: / shuttle opportunity
>
> James,
> Seems like we might inadvertently have got rather interested!
> They are now favoring it as their #1 option for the vacuum chuck on
> their atmospheric robot.
> Ideal timescales for them are 15 units in October and then -100/year
> from March 2001.
>
> So, thought I'd throw that into the mix. They would pay \$1000 per
> unit - might pay for a molding tool or something.
>
> Let's have a more serious discussion in the next few days - I cannot
> recall the date for the next decision making gate.
>
> Regards,
> Michael